

BULLETIN

OF THE INSTITUTE OF METALS

VOLUME 5

SEPTEMBER 1959

PART I

INSTITUTE NEWS

Joint Meeting in Bristol with the Society of Chemical Industry

The Institute is holding a joint meeting with the Bristol Section of the Society of Chemical Industry on Thursday, 3 December 1959, when Dr. G. A. WOLSTENHOLME will present a paper on "Beryllium Metal: Production, Properties, and Applications". The meeting will take place in the Chemistry Department of the University, Woodland Road, Bristol 8, at 6.0 p.m. Afterwards there will be an informal dinner in the Senior Common Room.

Annotated Equilibrium Diagrams of Some Aluminium Alloy Systems

The Institute has recently published in the Monograph series "Annotated Equilibrium Diagrams of Some Aluminium Alloy Systems" by H. W. L. PHILLIPS.

This monograph consists of annotated equilibrium diagrams of twenty binary and twelve ternary aluminium alloy systems. In each case the published literature has been carefully assessed and what are regarded as the most reliable results are presented in a series of diagrams with critical notes and references.

The author, Mr. H. W. L. Phillips, has been associated for many years with the Research Laboratories of The British Aluminium Co., Ltd., and has himself been responsible for a great deal of work on the constitution of aluminium alloys.

Copies may be obtained through booksellers or direct from the Institute, price 30s. (\$4.65), post free. Members may obtain one copy at the reduced price of 21s. (\$3.50), post free.

"Metallurgical Reviews" Committee

Dr. IVOR JENKINS has relinquished the Chairmanship of the "Metallurgical Reviews" Committee and the Council has appointed Professor R. W. K. HONEYCOMBE in his place.

Dr. Jenkins had been Chairman of the Committee since its formation at the end of 1954. Before that he had been Chairman of an Ad Hoc Committee set up to study and advise on proposals for the publication of reviews of progress in the field of metallurgy. He had therefore been closely associated with the project from its very beginning, and the fact that *Metallurgical Reviews* are now firmly established and have won a high reputation is to a large extent due to Dr. Jenkins's enthusiasm and hard work.

Election of Members

The following 12 Ordinary Members and 2 Student Members were elected on 3 September 1959:

As Ordinary Members

- ACCARY, André, Ing., Doct. ès Sc., Ingénieur chef du Groupe Frittage, Centre d'Etudes Nucléaires de Saclay, Commissariat à l'Energie Atomique, Gif-sur-Yvette (S. et O.), France.
- BAREQUET, David, B.Sc., A.R.C.S.T., Quality Superintendent, Israeli Steel Mills, Haifa, Israel.
- BULLOCK, Hemenway R., Senior Engineer, in charge of Metals Laboratory, Raytheon Manufacturing Co., Thompson Street, Maynard, Mass., U.S.A.
- FLINT, Oliver, Senior Experimental Officer, Corrosion Section, Metallurgy Division, Atomic Energy Research Establishment, Harwell, Berks.
- DE GÖUYON MATIGNON, Jean-Xavier, Ing., Ingénieur, Centre International de Développement de l'Aluminium, 23 rue Balzac, Paris (8^e), France.
- JOHNSON, Wayne Earl, Technical Manager, Mills Division, Scovill Manufacturing Co., Waterbury, Conn., U.S.A.
- JOHNSTON, Gordon Basil, B.Sc., A.S.T.C., A.I.M., Lecturer in Metallurgy, Newcastle University College, University of New South Wales, Tighes Hill, N.S.W., Australia.
- JONGENBURGER, Professor Petrus, Phys.engr., Professor of Metallurgy, Technische Hogeschool, Laboratorium voor Metallkunde, Delft, Netherlands.
- PLANNER, Bernard P., Dr.-Ing., Metallurgical Consultant (Scientific Liaison Officer), Armour Research Foundation of the Illinois Institute of Technology, Surinamestraat 16, The Hague, Netherlands.
- RICHMAN, Marc Herbert, B.S., Instructor in Metallurgy, Department of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., U.S.A.
- STANLEY, William, B.Sc., Technical Advisor, Tanganyika Holdings, Ltd., 95 Gresham Street, London, E.C.2.
- WHITEHEAD, Thomas Charles Gill, B.Sc., A.R.I.C., Partner, Pattinson and Stead, 11 Queen's Terrace, Middlesbrough.

As Student Members

- CROOKES, Alan Frank, Technical Apprentice, Metallurgical Department, Samuel Fox and Co., Ltd., Stocksbridge, near Sheffield.
- GROSSMANN, Georg Karl, Undergraduate, Department of Metallurgy, University College of Swansea.

INSTRUCTIONAL MEETINGS FOR YOUNGER MEMBERS

The first Instructional Meeting for Younger Members, organized by the Metallurgical Engineering Committee, was held on 7-9 May at Ashorne Hill, near Leamington Spa. Mr. C. Paton and Mr. J. Salter acted as Directors of Studies, and were assisted by Mr. P. T. L'Appell and Mr. F. Kasz. The subject for study was "The Design and Operation of Melting Furnaces in the Non-Ferrous Industry".

The main object of the meeting was to give an exercise in tackling a complex problem by breaking it down into its component parts for individual observation and enquiry, followed by a synthesis of the findings into valid conclusions, using the method of open, critical discussion. It was also hoped that the meeting would serve to give the participants confidence in presenting and criticizing technical theses in open debate, that knowledge would be broadened, and that the personal contacts made might be helpful to the Industry.

By 6.0 p.m. on 7 May some 32 members had arrived, representing an interesting cross-section of metallurgical interests. It was pleasing to see amongst them one member from Denmark. Following an after-dinner briefing by Mr. Salter, the members broke up into syndicates, each of which elected its own chairman, and considered the detailed lines of its enquiry. Each syndicate had been given a different part of the problem to study, viz.:

- A. Factors affecting the choice of a melting furnace.
- B. Preparation of heats.
- C. Relative merits of various fuels and their use.
- D. Control of melting furnace operations.
- E. Factors affecting furnace siting and layout of associated plant.

Members spent the next day in Birmingham, visiting the Kynoch works of Imperial Chemical Industries, Ltd., Metals Division, Witton, and James Booth and Co., Ltd., Kitts Green, where they were able to see and discuss practices relevant to copper, titanium, aluminium, and the alloys thereof. The hospitality of our hosts was manifest in many directions, and not least in the way they stood up to cross-examination by 32 sleuth-hounds!

After dinner that evening and again on the morning of Saturday, 9 May, the syndicates met separately to discuss their findings, sift them critically, and condense them into conclusions which could be presented in 10-15 minutes.

From 11.30 a.m. to 5 p.m. on Saturday, with a break for lunch, all syndicates met in open session. Each chairman presented his syndicate's conclusions, and these were then criticized by any who cared to do so, and amended as necessary. Naturally, the basic questions posed to the meeting did not have uniquely correct answers; complete answers would have required a knowledge of parameters which had deliberately been left unspecified. But the discussion was of a notably high standard in its persistent focus on the relevant considerations, its quickness to see the weak points, its uninhibited nature, and its earnest enthusiasm sometimes spiced with humour. The meeting was able to arrive at sound basic conclusions on the factors that influence the design and operation of melting furnaces in different circumstances. After a summing up by the Chairman, Mr. C. Paton, the meeting ended at about 5.30 p.m.

As the Institute's first experiment in this kind of meeting, it

showed up some details which could be improved in further meetings of the same kind. But from the reactions of "the students", and of those who were privileged to assist their studies, there can be no doubt that it was a worthwhile venture that justified repetition. The syndicate system worked well. Members quickly appreciated the value of the "breakdown + synthesis" technique to gather maximum information in minimum time; and an excellent spirit of co-operative endeavour was soon shown. In the syndicates, and in open discussion, it was very quickly made clear that the optimum design and operation of furnace for metal A, would not necessarily be the first choice of those whose interests lay with metal B. To this extent, the meeting broadened participants' awareness of the problem's ramifications more rapidly than would otherwise have been the case. The discussions showed no lack of constructive ideas; a few were demolished by pertinent criticism, but many others were a stimulus to further serious consideration.

The younger member is surrounded by a wealth of experience in his own organization, and for this reason he is often diffident in expressing his own criticisms and suggestions. A meeting of the present kind, where all experiences lie within a limited bracket, and where no one is senior to anyone else, more easily avoids this diffidence. Ideas and suggestions emerge that are otherwise suppressed by the individuals themselves; in critical discussion, the participant fully appreciates the value of "observe, measure, check, and cross-check" before advancing his suggestion. New ideas are acquired, and experience is broadened—particularly in appreciating that "the other fellow" may have particular problems which are not removed by one's own solution. It is felt that the Ashorne Hill meeting did help members to appreciate the significant components of a problem, and to develop confidence in proposing their solutions, and in defending them on sound technical grounds. It is believed that it realized the objects set for it, though it is naturally hoped that growing experience with further meetings will increase their value.

The main criticism was that the meeting was too short to achieve as complete solutions to the various problems as participants would have desired. To some extent, this was a valid criticism. But apart from the fact that the problems chosen had no unique solutions, the time for the meeting was deliberately kept short to minimize demands on employers. And the circumstance was not without value, in putting "the students" under those pressures, familiar to most in Industry, that demand the answer "yesterday, or sooner".

Those of us who were privileged to assist the younger members at Ashorne Hill found it a stimulating experience, and as one of us remarked at the end, "Well, if that's the calibre of young men coming up, the metallurgical industry has no need to worry about its future".

It is hoped that employers will find these meetings of value and that they will continue to support them, by encouraging their younger members to attend, and by giving facilities for such courses to visit their works.

The Metallurgical Engineering Committee is planning another meeting in 1960, the subject chosen being "Preheating and Hot-Rolling Practice". The date and other details will be announced in the *Bulletin* later.

F. K.

PERSONAL NOTES

MR. A. ASH has left Frederick Braby and Co., Ltd., Glasgow, to become Technical Service Engineer (Galvanizing), Consolidated Mining and Smelting Co. of Canada, Ltd., Toronto.

MR. R. G. BHATAWADSKAR has relinquished his post as Director of Research (Metallurgical and Chemical) in the Indian Ministry of Railways and has joined the Tata Locomotive and Engineering Co., Ltd., Jamshedpur.

ING. R. CARMINA has been elected a Vice-President of the Associazione Italiana di Metallurgia for 1959.

DR. F. A. CHAMPION has been appointed Senior Research Chemist, The British Aluminium Co., Ltd.

MR. S. E. CLOTWORTHY, Managing Director of the Northern Aluminium Co., Ltd., has been elected a Member of Council of the British Non-Ferrous Metals Research Association.

PROFESSOR F. DE CARLI has been elected President of the Associazione Italiana di Metallurgia for 1959.

MR. D. DENNISON has been appointed Lecturer in Metallurgy at the Rutherford College of Technology, Newcastle-upon-Tyne.

MR. M. DONOVAN has left The General Electric Co., Ltd., to become Chief Welding Metallurgist to British Aerojet, Ltd., Banwell, Somerset.

DR. W. R. HIBBARD, JR., has received the 1959 Yale Engineering Association Award for the Advancement of Basic and Applied Science.

DR. J. H. HOLLOMON has been elected a Fellow of the American Academy of Arts and Sciences.

PROFESSOR M. C. HUFFSTUTLER is now at the Department of Metallurgy, University of California, Berkeley 4, Calif.

DR. W. A. JOHNSON has been appointed Manager of Metallurgy and Chemistry of the Tapco Group of Thompson Ramo Wooldridge, Inc.

DR. A. B. MCINTOSH has joined the Board of the Production Group of the United Kingdom Atomic Energy Authority as Development Director, after eight years as head of the Culcheth Laboratories.

DR. R. F. MEHL, Dean of Graduate Studies at Carnegie Institute of Technology, Pittsburgh, Pa., has been awarded the Vincent Bendix Gold Medal of the American Society for Engineering Education. He has also received recently honorary degrees from the Case Institute of Technology, Cleveland, Ohio, and the University of Pennsylvania.

DR. R. T. PARKER has been appointed a Director and Vice-President of Aluminium Laboratories Limited. Dr. Parker recently took charge of the Banbury and Geneva offices of the Company in succession to Mr. R. D. Hamer.

MR. G. W. PARRY has left University College, Swansea, and is now a research metallurgist with the Hudson Bay Mining and Smelting Co., Flin Flon, Manitoba.

MR. H. W. L. PHILLIPS has retired from his position of Assistant Director, Research Laboratories of The British Aluminium Co., Ltd.

DR. C. E. RANSLEY has been appointed Senior Research Metallurgist, The British Aluminium Co., Ltd.

MR. R. ROLLS has been awarded the M.Sc. degree of Durham University.

MR. L. E. SAMUELS, of the Defence Standards Laboratories, Alexandria, N.S.W., has been awarded the D.Sc. degree of Melbourne University.

MR. J. STRAUSS, retired Vice-President of the Vanadium Corporation of America, has been made an Honorary Member of the American Society for Testing Materials.

MR. A. W. TRASH, formerly Chief Chemist and now acting Consultant, has been associated with the firm of H. J. Enthoven and Sons, Ltd., for 50 years.

MAJOR P. C. VARLEY has been appointed Assistant Director of Research (Metallurgical), The British Aluminium Co., Ltd.

MR. C. B. H. DE WINTON has been transferred from the Northern Aluminium Co., Ltd., to the parent company in Montreal.

OBITUARY

Mr. Matthew Hay

There was widespread regret at the sudden death of Mr. Matthew Hay which took place on 30 June.

Born in 1904, Mr. Hay was educated at Barrhead High School, Glasgow High School, and the Royal Technical College. He served his apprenticeship with Messrs. John Macdonald and Co., Ltd., Hydraulic Engineers, Pollokshaws, Glasgow, and later held appointments in several firms engaged in the design of mechanical-handling equipment and plant related thereto.

In 1941, Mr. Hay joined the firm of A. Cohen and Co., Ltd., London, and was, until his death, Manager of their Glasgow Works.

He was a member of the Institution of Engineers and Shipbuilders in Scotland, the Institute of British Foundrymen, and the Institute of Metals. In his capacity as Honorary Secretary of the Scottish Local Section of the Institute of Metals, he had much to do with the very successful Autumn Meetings held in Glasgow in 1947 and 1957.

Mr. Hay lived in Uplawmoor, Renfrewshire, and was an office bearer in the local Church. He was an active member of the Renfrewshire Unionist Association, and a founder member of Govan Rotary Club, of which he was President in the year 1958-9.

The respect in which he was held was indicated at the funeral by a large representation of shipbuilding and engineering firms and of the technical and other organizations with which he had been associated.

Mr. Hay is survived by his wife and daughter.

Mr. Erwin Loewy

Erwin Loewy, founder and head of Loewy-Hydropress Co. and a Vice-President of its parent company, the Baldwin-Lima-Hamilton Corporation, died of a heart attack in New York on 13 July.

Born in Czechoslovakia in 1897, Loewy studied in Prague, Germany, and France. In 1925 he joined the Schloemann A.G., Düsseldorf. At this time he was already in close contact with American industry, and later, in 1940, he established permanent residence in the U.S.A., where he founded the Loewy-Hydropress Co. to build hydraulic presses and rolling mills. Before the U.S. entry into World War II, Loewy warned the Government that the country would need special machinery for a speedy build-up of the Air Force, and he subsequently built eighty heavy extrusion-press installations, the main force of the defence plants which supplied the U.S. Air Materiel Command.

After Germany's collapse, the U.S. Air Force sent Loewy as a Colonel to Germany to make a survey and evaluation of the German heavy-press industry. His findings led to the initiation of the Heavy Press Programme of the U.S. Air Force, which included the most powerful machines ever built.

Several years ago Loewy entered the industrial field of rocket and missile handling and launching equipment, and built the famous ship-motion simulator for the *Polaris*, launching installations for the International Geophysical Year, and shipboard handling and stowage systems for the Missile Programme of the U.S. Department of Defence.

Loewy was greatly interested in music and was Chairman of the Board of the City Symphony Orchestra of New York.

JOINT ACTIVITIES

British Nuclear Energy Conference

Members are reminded that the Institute of Metals is one of the constituent societies of the British Nuclear Energy Conference and that they are entitled to attend meetings sponsored by the Conference at any of the other constituent societies and to receive the quarterly British Nuclear Energy Conference Journal at half price, viz. 30s. per annum. Subscriptions should be sent direct to the British Nuclear Energy Conference, 1-7 Great George Street, London, S.W.1.

Symposium on the Determination of Gases in Metals

The Society for Analytical Chemistry, The Iron and Steel Institute, and The Institute of Metals are holding a Joint Symposium on Tuesday and Wednesday, 3 and 4 May 1960, at Church House, Westminster, London, S.W.1, on "The Determination of Gases in Metals". Three sessions are envisaged, occupying the afternoon of 3 May and the morning and afternoon of 4 May. At the first session invited review papers will be presented covering the determinations of oxygen, hydrogen, and nitrogen in a general way; the other two sessions will be devoted to shorter papers and discussions dealing with specialized aspects of the field.

It is intended that preprints of all the papers shall be available before the start of the Symposium and that the proceedings, including discussions, will be published in a single volume at a later date.

OTHER NEWS

Fulmer Research Institute

An Open Day was held at the Fulmer Research Institute on 16 July. Over two hundred guests attended, and the occasion marked the completion of two new buildings to house the Physics Laboratory and the Workshop.

The Institute undertakes sponsored research, mainly in the fields of metallurgy, physical and inorganic chemistry, and physics, and a cross-section of the work in progress was exhibited.

The study of reactive metals and their alloys represents a high proportion of the effort. The results of studies of the U_2Mo phase, the miscibility gap in the uranium-niobium system, and the effect of ternary additions on the transformation characteristics of the γ -uranium solid-solution phase were

exhibited. The structure of the β -phase in uranium and dilute uranium alloys, and the structures of uranium complexes are being studied by X-ray diffraction.

A high-temperature X-ray diffraction camera developed at the Institute, in which specimens can be examined at temperatures up to $1000^\circ C$ and in a vacuum of 10^{-7} mm Hg, is being used to study the ω -phase in zirconium alloys. Work is also in progress on the oxidation-resistance of zirconium alloys in carbon dioxide.

An X-ray diffraction geiger-counter spectrometer is used to study the structure of liquid metals. Following work on sodium and potassium, the breakdown in structure with temperature of "molecular" liquids such as gallium, bismuth, and tin is being studied. Interesting results are also being obtained on alloys such as gold-tin, which show a high degree of order.

In the corrosion laboratory, the results of work on layer corrosion, stress corrosion, and corrosion fatigue of aluminium alloys were shown. A non-destructive method of corrosion testing has been developed at the Institute. In this the specimen is deflected elastically and for a given load the deflection gives a measure of the change in dimensions due to corrosion.

In the ferrous field low-alloy silicon-aluminium steels with air oxidation rates similar to that of 18:8 stainless steel in the 600 – $950^\circ C$ range have been developed, and the oxidation-resistance of iron-aluminium alloys is being studied. The corrosion by condensed sulphuric acid of cast iron used for cylinder liners in diesel engines operating with sulphur-rich oils has been shown to be inversely proportional to the silicon content.

Current research on chromium and its alloys aims at overcoming brittleness by previous warm working and heat-treatment.

A Metropolitan Vickers EM3A electron microscope is being used in current researches to investigate the build-up of deposits in oil-burning furnaces, the fundamental nature of slip lines, and surface oxidation.

Large-scale equipment for enamelling aluminium is available. For certain nuclear-engineering purposes enamels capable of high-voltage insulation and quite free from defects are required. Surface preparation, slip making, application, and firing are all under close control.

The influence of trace elements on the mechanism of precipitation-hardening is currently being studied. A correlation exists between the atomic size factor of the trace element and its influence on ageing.

In the Chemistry section, highly accurate determinations of the heats of formation of many substances have been made. These include uranium-silicon compounds, uranium mononitride, and metal halides. The carbon activities in iron-chromium-carbon alloys are being determined, and vapour-pressure measurements are being used to obtain information about the uranium-bismuth and thorium-bismuth systems.

Colloquium on the Shaping of Sheet Metal and the Testing of Sheet

The Société Française de Métallurgie and the International Deep Drawing Research Group (IDDRG) are organizing a Colloquium on Sheet Metal Forming, with special emphasis on Methods of Testing.

The Colloquium will take place in Paris from 23 to 25 May 1960. Provisionally, the programme will cover: "Theoretical Studies of Sheet Metal Forming and the Materials Used in

Sheet Forming" (half a day), "Sheet Metal Testing" (one day), and "New Techniques of Sheet Metal Forming" (short papers) (half a day).

Authors who wish to present a paper should send both the title and a brief summary to the Secretariat before 1 November 1959. The exact programme may be subject to revision and the number of papers selected has to be limited. The organizing committee will decide on its choice of papers and the committee will inform the respective authors of its decision before 1 December 1959. The completed or provisional texts of the selected papers should be in the hands of the organizing committee before 15 February 1960.

The text of the articles or papers must be in one of the three official languages: French, English, or German. The text should be prefaced with a brief summary in each of the three languages.

Secretaries of the Colloquium are: M. M. Dupont, Secrétaire Général de la Société Française de Métallurgie, 25, rue de Clichy, Paris (9^e), and Dr. S. Garber, BISRA Laboratories, Hoyle Street, Sheffield 3.

Third International Die-Casting Conference

The Third International Pressure Die-Casting Conference is being organized for the European Pressure Die-Casting Committee by the Italian member of the secretariat, the Istituto Italiano del Piombo e dello Zinco, with the help of the pressure die-casting section of Assomet (the National Association of Non-Ferrous Metal Industries). It will be held at Stresa, on Lake Maggiore, from 16 to 20 May, 1960.

Interest in die-casting and its applications is constantly growing, and attractions at the 1960 conference will include displays by the world's leading die-casting machine makers and an exhibition of European castings in zinc, aluminium, and magnesium alloys.

Two days of the conference will be devoted to technical sessions and two days to works visits. Twelve papers will be given and ample time will be reserved for full discussions on each paper. A "question and answer" session is to be held on the second afternoon. The papers, all of which have been specially invited by the European Committee, will be sent out about a month before the conference to those who have enrolled. They will be available in French, German, and Italian, as well as English (these are the four official languages which will be available at the meetings through simultaneous translation).

Conference fees of 37,000 Lire (£21 sterling) are payable in advance or on arrival at Stresa; ladies and other guests not taking part in the technical sessions or works visits may attend the social functions for a fee of 6500 Lire (£4 sterling). Enrolment forms, preliminary programmes, and descriptive leaflets about Stresa are obtainable from the Zinc Development Association, 34 Berkeley Square, London, W.1.

First International Congress on Metallic Corrosion

The First International Congress on Metallic Corrosion will be held in London during the week 10-15 April 1961, under the Presidency of Sir Harry Melville. Mr. E. Leslie Streatfield has been appointed Chairman of the Executive Committee and Dr. J. Ferguson, Chairman of the Finance Committee. The Honorary Secretary is Lt.-Col. Francis J. Griffin.

Further information may be obtained from the Honorary Secretary at 14 Belgrave Square, London, S.W.1.

Symposium on "Pilot Plants in Metallurgical Research and Development"

A Symposium on "Pilot Plants in Metallurgical Research and Development" will be held in India, under the auspices of the National Metallurgical Laboratory, early in February 1960.

The scope of the Symposium will broadly cover the following:

1. Pilot-plant projects in relation to laboratory-scale investigations on the one hand and their industrial-scale implementation on the other.
2. The importance of pilot-plant investigations in relation to assessment of overall economics of the processes, production costs, &c., as a guide to industrial-scale implementation.
3. The present set-up and outline of pilot-plant projects in metallurgical research and industries in India.
4. Outline of some important pilot-plant projects relating to metallurgical research and development operating in different parts of the world.
5. Pilot plants relating to mineral dressing and thermal and chemical beneficiation of low-grade ferrous and non-ferrous ores.
6. Pilot plants based on pyrometallurgical operations such as the low-shaft furnace for smelting of iron ores, oxygen steel-making methods, direct reduction of iron ore, and others relating to iron and steel production technology.
7. Electrometallurgical pilot plants based on electrowinning of metals.
8. Pilot plants relating to the production of new refractories and their market evaluation in industry.
9. Pilot plants relating to hot and cold working of ferrous and non-ferrous metals.
10. Pilot plants relating to finishing of metals, such as anti-corrosive hot-dip coating process, aluminizing, decorative-cum-protective chemical processes, &c.
11. Materials of construction for metallurgical pilot plants including equipment, instrumentation, and components required in relation to their indigenous availability.
12. Cost accounting and overall assessment of the economics of applied processes in terms of capital and operational costs, &c. Statistical analysis and assessment of pilot-plant test data.

Invitations are being extended to engineers, technologists, metallurgists, and research scientists in India and abroad to attend the Symposium in person and contribute technical papers for discussion.

Further details may be obtained from Dr. Nijhawan, Director of the National Metallurgical Laboratory, Jamshedpur 7, India.

Industrial Museum of South Wales

Exhibits are now being collected to form the nucleus of an industrial museum which will be housed in the Royal Institution of South Wales at Swansea. A company has been formed—Industrial Museum of South Wales, Ltd.—and many industrial concerns in the Swansea area are either members or contributors to the Company. It is hoped that many others will support the museum financially and by gift or loan of suitable exhibits.

The Secretary of the Museum is Professor H. O'Neill, Professor of Metallurgy at University College, Swansea, and a Vice-President of the Institute.

DIARY

The Institute

- 12 November. Symposium on "The Application of Thin-Film Techniques to the Electron-Microscopic Examination of Metals". (Royal Institution, Albemarle Street, London, W.1, at 9.30 a.m. and 2.15 p.m.)

British Nuclear Energy Conference

- 25 November. Thomas Hawksley Lecture: "The Effect of Nuclear Radiation on Engineering Materials", by Professor A. H. Cottrell. (The Institution of Mechanical Engineers, 1 Birdcage Walk, London, S.W.1, at 6.0 p.m.)

Local Sections and Associated Societies

- 29 October. Southampton Metallurgical Society. "The Nimonic Alloys", by Dr. W. Betteridge. (Engineering Block, Southampton University, at 7.15 p.m.)
- 3 November. Oxford Local Section. "The Theory of Rolling", by Professor H. Ford. (Cadena Café, Cornmarket Street, Oxford, at 7.0 p.m.)
- 5 November. Liverpool Metallurgical Society. "Ductile Fracture", by Professor R. W. K. Honeycombe. (Library of the Department of Metallurgy of the University of Liverpool, 146 Brownlow Hill, Liverpool 3, at 7.0 p.m.)
- 5 November. London Local Section. "The Struggle for High Temperatures", by Dr. F. D. Richardson. (Royal School of Mines, Prince Consort Road, London, S.W.7, at 7.0 p.m.)
- 10 November. South Wales Local Section. "Economics of Rolling-Mill Layouts", by W. F. Cartwright. (Department of Metallurgy, University College, Singleton Park, Swansea, at 6.45 p.m.)
- 11 November. Liverpool Metallurgical Society. Joint meeting with the Institute of Welding (Liverpool Branch). "Welding in Warship Construction", by W. R. Seward. (Picton Library, Liverpool, at 7.30 p.m.)
- 11 November. Manchester Metallurgical Society. "Bearing Metals", by P. G. Forrester. (Manchester Room of the Central Library, Manchester, at 6.30 p.m.)
- 12 November. Leeds Metallurgical Society. "Aluminium Casting Alloys and Foundry Practice", by W. L. Bolton. (The Metropole Hotel, Leeds, at 6.30 p.m.)
- 18 November. Southampton Metallurgical Society. Joint meeting with the Institute of British Foundrymen. "Properties of Copper-Base Alloy Castings", by F. Hudson. (Southampton Technical College, at 7.30 p.m.)
- 19 November. Sheffield Local Section. "Primitive Metallurgy", by Professor F. C. Thompson. (Applied Science Building, The University, St. George's Square, Sheffield 1, at 7.30 p.m.)
- 23 November. Scottish Local Section. "Continuous Casting of Bronze", by Professor E. C. Ellwood. (39 Elmbank Crescent, Glasgow, C.2, at 6.30 p.m.)
- 25 November. Manchester Metallurgical Society. "Engineering Aspects of Civil Nuclear Power Stations", by B. D. Willson. (Manchester Room of the Central Library, Manchester, at 6.30 p.m.)

APPOINTMENTS VACANT

ENGLISH ELECTRIC

MECHANICAL ENGINEERING LABORATORIES

Whetstone, Near Leicester

FRICTION AND WEAR
RESEARCH

An appointment has arisen for a senior honours graduate

METALLURGIST
PHYSICAL CHEMIST
OR
PHYSICIST

to join a group studying the mechanism of friction and wear in unusual environments.

Applicants are invited to write to Dept. C.P.S., Marconi House, 336/7 Strand, London, W.C.2 quoting reference JM 1914B.

GILLETTE INDUSTRIES LIMITED

Islworth, Middlesex,
require

a Qualified Metallurgist

The successful candidate will be between 23 and 30 years of age and will have had some experience of the metallurgy of ferrous and non-ferrous metals, with further experience in operations such as hot-stamping, pressing, machining, and general allied engineering processes. His duties will involve the investigation of problems arising out of current manufacturing methods and the quality control of raw materials such as blade strip, rod and strip brass and aluminium.

Salary will be dependent upon age, qualifications, and experience. Fringe benefits include a non-contributory pension scheme and free life insurance for married men.

Applications in writing, which will be treated in strictest confidence, should give full details of age, education, experience and present salary, and should be addressed to the Personnel Controller, quoting reference EAS/114.

PHYSICAL METALLURGIST required by large base-metal company located in south-eastern British Columbia, Canada. The position involves investigational and research work connected with the industrial and commercial applications of lead and zinc. Applicants should forward full particulars of personal history, training, and experience to Supervisor, Staff Department, The Consolidated Mining and Smelting Company of Canada, Limited, Trail, B.C., Canada.

UNIVERSITY OF THE WITWATERSRAND,
JOHANNESBURG

Chair of Metallurgy

Applications are invited for appointment to the post of Professor of Metallurgy in the Department of Metallurgy. Duties are to be assumed as soon as possible in 1960.

The salary attached to the post is on the scale £2450 × 75—£2750. In addition, the University is at present authorized, subject to government regulations, to pay an annual vacation savings bonus of £60 to a married man.

Membership of the University Institutions Provident Fund is compulsory. Membership of the Staff Medical Aid Fund is also compulsory in the case of an officer who is eligible for such membership.

Applicants are advised to obtain a copy of the information sheet relating to the above vacancy from the Secretary, Association of Universities of the British Commonwealth, 36 Gordon Square, London, W.C.1.

Applications close in South Africa and London on 15 November 1959.